

WHAT IS CLAIMED IS:

1. An optical fiber component for Raman amplification, comprising:

an optical fiber for Raman-amplifying signal light
5 of a plurality of channels of mutually different wavelengths;
and

a device, inserted at a predetermined position in said optical fiber for Raman amplification, selectively attenuating by 10 dB or more light that propagates in an
10 opposite direction to the signal light,

wherein said device is inserted at a position where an effective deterioration amount of an optical SN ratio produced by DRBS-XT (Double Rayleigh Back Scattering-Crosstalk), at a signal output terminal of said
15 optical fiber for Raman amplification, becomes 1 dB or less.

2. An optical fiber component for Raman amplification according to claim 1, wherein, when an effective length of said optical fiber for Raman amplification at a wavelength of pumping light is taken as
20 1, said device is arranged at a position separated by a predetermined distance from an input position of the pumping light such that the effective length seen from the input position becomes 0.4 to 0.6.

3. An optical fiber component for Raman
25 amplification according to claim 1, wherein, when a gain obtained by said optical fiber for Raman amplification as

a whole is taken as 1, said device is arranged at a position separated by a predetermined distance from a signal input terminal such that a gain of 0.4 to 0.6 can be obtained in a gain distribution along a longitudinal direction of said optical fiber for Raman amplification.

4. A Raman amplifier including an optical fiber component for Raman amplification according to claim 1.

5. A Raman amplifier according to claim 4, further comprising:

a pumping light source for supplying pumping light for generating Raman gain in a predetermined wavelength band in said optical fiber for Raman amplification; and

a multiplexing structure for guiding the pumping light from said pumping light source into said optical fiber for Raman amplification.

6. A Raman amplifier according to claim 4, wherein, when a Raman gain coefficient of said optical fiber for Raman amplification is taken as g_R and an effective area is taken as A_{eff} , a ratio g_R/A_{eff} of the Raman coefficient with respect to the effective area of said optical fiber for Raman amplification at a wavelength of pumping light is 5 (1/Wkm) or more.

7. An optical communications system including a Raman amplifier according to claim 4.

8. An optical fiber component for Raman amplification, comprising:

an optical fiber for Raman-amplifying signal light
 of a plurality of channels of mutually different wavelengths;
 and

a device, inserted at a predetermined position in said
 5 optical fiber for Raman amplification, selectively
 attenuating by 10 dB or more light that propagates in an
 opposite direction to the signal light,

wherein said device is inserted at a position where
 an absolute value $|MPI-XT|$ of MPI (Multi-Line Interference)
 10 crosstalk at a signal output terminal of said optical fiber
 for Raman amplification and an optical SN ratio OSNR satisfy
 the condition:

$$0 \leq \log ((|MPI-XT| + OSNR) / |MPI-XT|) \leq 0.1$$

9. An optical fiber component for Raman
 15 amplification according to claim 8, wherein, when an
 effective length of said optical fiber for Raman
 amplification at a wavelength of pumping light is taken as
 1, said device is arranged at a position separated by a
 predetermined distance from an input position of the pumping
 20 light such that the effective length seen from the input
 position becomes 0.4 to 0.6.

10. An optical fiber component for Raman
 amplification according to claim 8, wherein, when a gain
 obtained by said optical fiber for Raman amplification as
 25 a whole is taken as 1, said device is arranged at a position
 separated by a predetermined distance from a signal input

terminal such that a gain of 0.4 to 0.6 can be obtained in a gain distribution along a longitudinal direction of said optical fiber for Raman amplification.

11. A Raman amplifier including an optical fiber
5 component for Raman amplification according to claim 8.

12. A Raman amplifier according to claim 11, further comprising:

a pumping light source for supplying pumping light for generating Raman gain in a predetermined wavelength band
10 in said optical fiber for Raman amplification; and

a multiplexing structure for guiding the pumping light from said pumping light source into said optical fiber for Raman amplification.

13. A Raman amplifier according to claim 11, wherein,
15 when a Raman gain coefficient of said optical fiber for Raman amplification is taken as g_R and an effective area is taken as A_{eff} , a ratio g_R/A_{eff} of the Raman coefficient with respect to the effective area of said optical fiber for Raman amplification at a wavelength of pumping light becomes 5
20 $(1/Wkm)$ or more.

14. An optical communications system including a Raman amplifier according to claim 11.

15. An optical fiber component for Raman amplification, comprising:

25 an optical fiber for Raman-amplifying signal light of a plurality of channels of mutually different wavelengths;

and

a device, inserted at a predetermined position in said optical fiber for Raman amplification, selectively attenuating by 10 dB or more light that propagates in an opposite direction to the signal light,

wherein said device is inserted at a position where an absolute value $|DRBS-XT|$ of DRBS-XT (Double Rayleigh Back Scattering-Crosstalk) at a signal output terminal of said optical fiber for Raman amplification and an optical SN ratio OSNR satisfy the following condition:

$$0 \leq \log ((|DRBS-XT| + OSNR) / |DRBS-XT|) \leq 0.1$$

16. An optical fiber component for Raman amplification according to claim 15, wherein, when an effective length of said optical fiber for Raman amplification at a wavelength of pumping light is taken as 1, said device is arranged at a position separated by a predetermined distance from an input position of the pumping light such that the effective length seen from the input position becomes 0.4 to 0.6.

17. An optical fiber component for Raman amplification according to claim 15, wherein, when a gain obtained by said optical fiber for Raman amplification as a whole is taken as 1, said device is arranged at a position separated by a predetermined distance from a signal input terminal such that a gain of 0.4 to 0.6 can be obtained in a gain distribution along a longitudinal direction of said

optical fiber for Raman amplification.

18. A Raman amplifier including an optical fiber component for Raman amplification according to claim 15.

19. A Raman amplifier according to claim 18, further comprising:

a pumping light source for supplying pumping light for generating Raman gain in a predetermined wavelength band in said optical fiber for Raman amplification; and

a multiplexing structure for guiding the pumping light from said pumping light source into said optical fiber for Raman amplification.

20. A Raman amplifier according to claim 18, wherein, when a Raman gain coefficient of said optical fiber for Raman amplification is taken as g_R and an effective area is taken as A_{eff} , a ratio g_R/A_{eff} of the Raman coefficient with respect to the effective area of said optical fiber for Raman amplification at a wavelength of pumping light is 5 (1/Wkm) or more.

21. An optical communications system including a Raman amplifier according to claim 18.